

FLORIDA HIGHWAYS



Road No. 2, Project 19, Hamilton County—Recently Completed Highway Through Residential Section of White Springs.

Vol. III

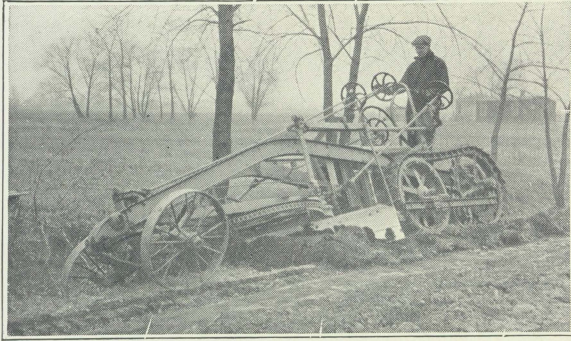
JULY, 1926

No. 7

**\$1.00
Per Year**

Published by the State Road Department

**Single Copies
10c**



With These Leaning Front Wheels You Can Do

Better Work: because these wheels keep the front end of the machine from slipping sideways, and thus hold the blade to a straight course.

More Difficult Work: because the leaning front wheels enable the Grader to work successfully on side slopes, like the one in the photograph above where a straight wheel machine would be useless.

Twice as Much of Any Kind of Work: because you can use the whole blade of an Austin Motor Grader and set it at the proper angle to move dirt. Straight wheel machines must do one of two things to keep from sliding away from their work; either set the blade so straight across the frame that it won't cut and simply fills the ruts the way a road drag does, or set the blade at a very sharp angle and then raise the heel so high that it just cuts a narrow furrow.

The Austin Motor Grader has many other exclusive features. These are all described in the new catalog, a copy of which will be gladly mailed to you upon request. Write for it today!

The Austin-Western Road Machinery Co.
400 N. MICHIGAN AVE. CHICAGO

Reinforcing Bars for Concrete

Made in the United States
from new billet steel.

Intelligent, dependable service
by expert bridgemen.

Dudley Bar Company

BIRMINGHAM, ALA.

Wood Preservers Since 1878

Eppinger & Russell Co.

CREOSOTED

Forest Products of all kinds

Ties, Lumber, Piles, Poles, Cross Arms
for Railroads, Bridges, Docks, Fences,
and other purposes where permanent
construction is required.

Also Manufacturers and Dealers in
Yellow Pine and Cypress

Main Office: 165 Broadway, New York
Branch Office: Jacksonville, Fla.
Plants at Jacksonville, Fla.
Long Island City, N. Y.

Information and Quotations Cheerfully Given.
Address Nearest Office.

Contractors' Bid and

Performance Bonds

And Insurance Requirements
Expediently Handled

Agents throughout Florida.

Harry F. Fromme & Co.

General Agents

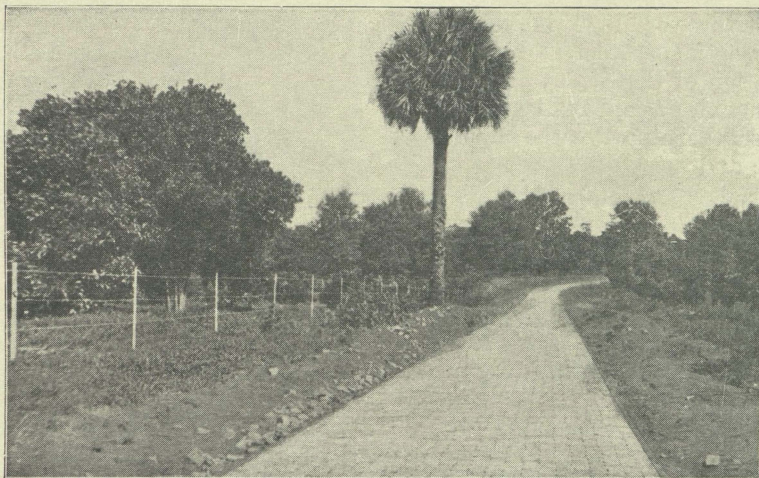
Jacksonville
Graham
Bldg.

Tampa
Citizens
Bank Bldg.

Miami
Myers-Kiser
Bank Bldg.

Florida

FLORIDA HIGHWAYS



Vol. III

JULY, 1926

No. 7

Transactions at Quarterly Meeting of the State Road Department, Tallahassee, Florida, July 6th, 1926

THE regular quarterly meeting of the State Road Department of the State of Florida was held at the offices of the Department in Tallahassee on Tuesday, July 6th, 1926, at ten o'clock A. M. The following members were present: Dr. F. A. Hathaway, Chairman; W. J. Hillman, Harvey Bayliss and I. E. Schilling. J. L. Cresap, State Highway Engineer; B. A. Meginniss, Attorney, and W. P. Bevis, Acting Secretary, were also in attendance. H. J. Morrison, Highway Engineer, was present as Representative of the U. S. Bureau of Public Roads.

Minutes of the quarterly meeting, held April 2nd, 1926, were read and on motion duly approved.

DADE COUNTY—Road 4—Project 41

Upon motion of Mr. Schilling, seconded by Capt. Hillman, the following resolution was adopted:

Resolved, That in the construction of curbs and gutters on Project 41 in Dade county, that the department permit the construction of same in accordance with specifications of the City of Miami for such work.

ROAD 50—Suwannee River Scenic Highway

The Chairman reported to the members that the request of the Department that Road 50, the Suwannee River Scenic Highway, between Jasper and Live Oak, be included in the Federal Seven Per Cent

System, has been approved and granted by the U. S. Bureau of Public Roads.

ROAD 27—LOCATION

The Chairman reported that under authority granted him by resolution adopted at the quarterly meeting in April, that the definite location of Road 27 has been made, and agreements carrying into effect his negotiations with the Boards of County Commissioners of Collier, Dade and Monroe counties, have been submitted to said boards; that the Dade County Board has executed and returned its agreement and that he expects return of executed agreements from Collier and Monroe within a short time.

STATE ROAD No. 1

On motion of Capt. Hillman, seconded by Mr. Bayliss, the following resolution was adopted:

Resolved, That the Chairman be and he is hereby authorized to enter into such agreements with the counties along State Road No. 1, between Lake City and Jackson county, as may seem wise and expedient to carry out the Department's paving program on Road 1 in those counties, the paving of the Suwannee River Scenic Highway in Suwannee county, and its paving program on State Road No. 10 in Leon county, these counties having already voted bonds for such purposes.

ROAD No. 27—Collier County

Upon motion of Mr. Schilling, seconded by Mr. Hillman, the following resolution was adopted:

Whereas, The Legislature in 1923 designated as State Road No. 27 the road from Fort Myers to Miami; and

Whereas, The Legislature of 1925 included the said road in the Preferential System and made its construction the obligation of the State; and

Whereas, The construction of said road is of great benefit, not only to the southern part of the State, but to the whole of Florida; and

Whereas, The Department has made its plans and did on the 24th day of August, 1925, let contract for the construction of a portion of said road in Dade county; and

Whereas, The Department is at the present time advertising for bids to be received July 21st for the construction of another section of said road in Dade county; and

Whereas, In further pursuance of the Department's program convict stockade has been erected and a large force of convicts will be shortly placed upon the western end of said road in Collier county; and

Whereas, The purpose of the State Road Department to construct said road is amply shown by its program hereinabove recited; and

Whereas, The Department has been officially advised by the County Commissioners of Collier county that said county has spent in the construction of said road through Collier county approximately one million dollars, which is an amount far in excess of that which has been spent by any other county in the construction of this road, and has further officially advised this Department that the resources of said county have been drawn upon to such an extent as to make further expenditures on said road by the county extremely burdensome; and

Whereas, This Department recognizes its obligation to construct said State Road No. 27 as speedily as possible along with the other roads in the State Preferential System and that time is of the essence of its program in connection therewith; now, therefore, be it

Resolved, by the State Road Department, That the Chairman be, and he is hereby authorized to proceed to the letting of contracts for the construction of said State Road No. 27 in Collier county as he has been heretofore in the other counties which the said road traverses.

ST. JOHNS COUNTY—Road No. 4—Right of Way

Upon motion of Mr. Schilling, seconded by Mr. Bayliss, the following resolution was adopted:

Whereas, This Department has found and determined and it is hereby found and determined that it is necessary, wise and expedient to secure by eminent domain the real estate hereinafter described for the purpose of a right of way for State Road No. 4 through St. Johns county, Florida; and

Whereas, There has been prepared and submitted a map or plat which shows in detail the location of said State Road No. 4, which said map or plat is hereto attached and marked Exhibit "A";

Now, therefore, be it Resolved, That the said map or plat be and the same is hereby adopted and approved

as and for the location of said State Road No. 4 through St. Johns county; and

Be it further Resolved, That the Board of County Commissioners of St. Johns county be and they are hereby requested and authorized to secure for this Department by purchase or condemnation the lands necessary for a right of way for said State Road No. 4, and particularly the lands described as follows, to-wit:

The first of said lands of which W. P. Holmes is the owner, to-wit:

Commencing at the iron pipe set on the south bank of Moultrie creek at the southeast corner of the present Moultrie creek county bridge, which is the northeast corner of the tract of land known as the St. Augustine Highlands; thence run south three hundred seventy (370) feet; thence west thirty-three (33) feet to a point of beginning, which is on the west side of the county road and also the northeast corner of this described property; thence run west on the north line of said tract fifty-two (52) feet; thence S. 9 deg. 33 min. W. for two hundred seventy-five (275) feet to the south line of the Holmes tract; thence east ninety-seven (97) feet to the west boundary of the county road; thence north on said boundary two hundred seventy (270) feet to the point of beginning.

This above described parcel of land lies in Section 48, T. 8 S. R. 30 E., and contains four hundred sixty-five thousandths (0.465) acre adjacent to the present county road as cut off from the present W. P. Holmes tract by State Road No. 4.

The second of said lands of which F. H. Genung is the owner, to-wit:

Commencing at the iron pipe set on the south bank of Moultrie creek at the southeast corner of the county bridge, which iron pipe is the acknowledged northeast corner of the St. Augustine Highlands tract; thence run south fifty-four (54) feet to the property of Dr. F. H. Genung for a point of beginning; thence run south on the east boundary of the county road three hundred sixteen (316) feet to the Alderman property; thence east seventeen (17) feet; thence N. 9 deg. 33 min. E. three hundred twenty-five (325) feet, more or less, to the A. W. Corbett dock tract; thence west sixty-five (65) feet to the point of beginning.

The above described tract contains three-tenths (0.30) acre and lies in Section 48 T. 8 S. R. 30 E. and adjacent to the east side of the present county road.

The third of said lands of which F. H. Genung is the owner, to-wit:

Commencing at the iron pipe set on the south bank of Moultrie creek at the southeast corner of the county bridge, which iron pipe is the acknowledged northeast corner of the St. Augustine Highlands tract; thence run south seventy (70) feet; thence west thirty-seven (37) feet to a point of beginning on the west boundary of the present county road; thence south on said boundary three hundred (300) feet; thence west fifty-two (52) feet; thence N. 9 deg. 33 min. E. three hundred five (305) feet to the point of beginning.

The above described triangle of land contains eighteen hundredths (0.18) acre and lies in Section 48 T. 8 S. R. 30 E., and adjacent to the west side and the present county road just south of the county bridge at Moultrie.



Road No. 2, F. A. Project 19, Hamilton County in the City of White Springs, Showing Completed Curb and Gutter and Surface Treatment of Asphalt and Slag. The Famous White Springs in the Background.

The fourth of said lands of which F. H. Genung and H. A. Boggs are the owners, to-wit:

Commencing at the iron pipe set on the south bank of Moultrie creek at the southeast corner of the county bridge, which iron pipe is the acknowledged northeast corner of the St. Augustine Highlands tract; thence run east seventy-two (72) feet; thence N. 9 deg. 33 min. E. one hundred (100) feet to a point of beginning at the low-water line on the north side of Moultrie creek; thence continuing N. 9 deg. 33 min. E. four hundred ten (410) feet, more or less to a point on the east line of Lot 1, Section 7, T. 8 S. R. 30 E.; thence north three hundred thirty (330) feet, more or less, on the east line of Lot 1 to a point on the east boundary line of the present county road; thence south 19 deg. W. fifty (50) feet; thence S. 10 deg. W. six hundred eighty (680) feet, on the east boundary line of the said county road to the low-water line on the north side of Moultrie creek; thence easterly seventy-one (71) feet along the low-water line of Moultrie creek to the point of beginning.

The above described parcel of land contains ninety-three hundredths (0.93) acre, more or less, and lies in Lot 1, Section 7, T. 8 S. R. 30 E. and adjacent to the east side of the present county road just north of the county bridge at Moultrie.

Be it further Resolved, That said County Commissioners be and they are hereby authorized to use the name of this Department in any condemnation pro-

ceedings necessary to carry out the purposes of this resolution or to proceed in their own name as authorized by law; and

Be it further Resolved, That in the event that they shall elect to proceed in the name of this Department that their attorneys be and they are hereby authorized to prepare, execute and file all necessary pleadings, affidavits and documents in connection therewith.

LAKE COUNTY—Road 2—Right of Way

Upon motion of Mr. Schilling, seconded by Mr. Hillman, the following resolution was unanimously adopted:

Whereas, This Department has surveyed and located State Road No. 2 in Lake county, between Helena Run and the Polk county line, and between Silver Lake Forks and Eustis, as is shown by plat of said location on file in this office, a copy of which is hereto attached and marked "Exhibit A," and

Whereas, Said Department has found and determined and does hereby find and determine that it is necessary, wise and expedient to secure by purchase or condemnation the lands necessary for a right of way as shown by said plat; now, therefore,

Be it Resolved, by the State Road Department of the State of Florida, That the County Commissioners of Lake County, Florida, be and they are hereby re-



Florida Highways

Published Monthly
Official Publication of the State Road Department

PERSONNEL OF DEPARTMENT

F. A. HATHAWAY (*Jacksonville*), *Chairman*
(*Official Residence, Tallahassee.*)
E. P. GREEN, *Bradenton*
W. J. HILLMAN, *Live Oak*
J. HARVEY BAYLISS, *Pensacola*
I. E. SCHILLING, *Miami*
WALTER P. BEVIS, *Tallahassee, Acting Secretary.*

PERSONNEL OF EMPLOYEES IN GENERAL CHARGE OF THE WORK OF THE DEPARTMENT

Engineering Division

J. L. Cresap, Tallahassee.....	State Highway Engineer
L. K. Cannon, Tallahassee.....	Ass't. State Highway Engineer
G. L. Derrick, Tallahassee.....	Bridge Engineer
C. W. DeGinther, Tallahassee.....	Ass't. Bridge Engineer
Harvey A. Hall, Gainesville.....	Testing Engineer
F. W. Berry, Jr., Tallahassee.....	Office Engineer
John R. Stewart, Gainesville.....	Supt. of Equipment
R. L. Bannerman, Marianna.....	Div. Engr.—1st Div.
J. H. Dowling, Lake City.....	Div. Engr.—2nd Div.
R. J. Cassie, Fort Pierce.....	Div. Engr.—3rd Div.
L. B. Thrasher, Ocala.....	Div. Engr.—4th Div.
A. W. Kinney, Lakeland.....	Div. Engr.—5th Div.
R. C. Fergus, Fort Lauderdale.....	Div. Engr.—6th Div.

Accounting Division

S. L. Walters, Tallahassee.....Accountant

This magazine is edited in the offices of the State Road Department, Tallahassee, and published monthly. Subscription rate, one dollar per year. Permission is granted to republish, with proper credit, the matter contained herein.

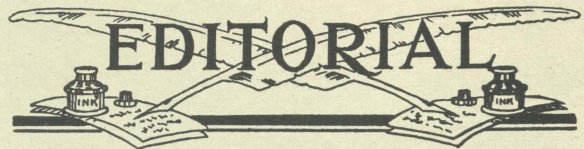
Application has been made for transmission through the mails as second-class matter.

B. A. Meginniss, Attorney for the Department,
Editor and Business Manager

Volume III

July, 1926

Number 7



The Engineers

Cincinnati is entertaining a distinguished company of engineers. Cincinnati and every other city, ancient or modern, is the product of the genius of engineers.

The great tower of Bel, the pyramids, the Parthenon, the enduring military roadways of Imperial Rome lived first in the brain of the engineer. The engineer was the pioneer of all civilization—the essential progenitor of art, literature and science. Without his guiding assistance the race never would have traversed continents and seas; never would have weighed and measured the stars; never would have spanned the earth with rails of steel or filled the heavens with the aerial craft of this wonderful age; never would have tunneled the eternal hills nor plumbed the ocean depths; never would have harnessed the Olympian thunderbolts—still would be struggling in the environment of a primitive barbarism.

The world is moving forward to surpassing destiny, and still the engineer, not the warrior, not the statesman, not the captain of commerce, leads the way.

So the paths of civilized progress for centuries have been smoothed for the feet of ever-coming generations by the men who measure, plan and build. In war and in peace they meet the exigencies of their times, triumphing over all obstacles.

Like all great constructive factors in the development of civilization, these men are not trumpet-blowers; they are the quiet, efficient agents in the scheme of purposeful progress.—Cincinnati Inquirer.

IF

By George Bancroft Duren

(With the usual apologies to Kipling.)

If you can climb a hill when all about you
The cars are coughing like a kid with croup;
If you can hit a mud road deep with puddles
And sail across it like an ocean sloop,
Or wear a treadless tire and not grow weary
And blow it out in some deserted place,
Or hit upon six cylinders entirely
When hail and snow and rain beat on your face;
If you can make a mile in sixty seconds,
And yet not make the love for speed your aim;
Then throttle down to half a mile an hour
And never stall to smirch my name with shame;
If you can last five years and not resemble
A pile of junk upon some ashman's heap;
If you can suffer lack of fuel and water
And still ride on without a single peep;
If you can promise me you have these virtues
And with them all you cost a modest fee,
Yours is this chugging world and all that's in it—
And what is more, you are the car for ME.
—Georgia Highways.

Comprehensive Marking of Florida Highways Has Been Agreed Upon

The State Road Department Has Adopted Uniform Direction and Danger Signs and Work of Erecting to Be Finished This Summer

(From All-Florida Motorist.)

ONE of the more interesting stages reached in the unbroken advancement of Florida's great road-building program finds the State Road Department ready to begin the erection of road markers and danger signs along the principal highways of the State, with the assurance from the office of Chairman Fons A. Hathaway at Tallahassee that the work will be started within the next thirty days and completed by the end of the approaching summer.

Equally important to motorists in this respect is the wisdom shown by members of the State Road Department, under the guidance of Dr. Hathaway, in selecting L. K. Cannon, Assistant State Highway Engineer, to supervise the big task. Mr. Cannon has been associated with the department for the past eight years and is recognized as one of the most efficient members of the engineering staff in handling tasks of this magnitude. His adaptability to such exacting detail as will be required to produce the most serviceable results gives assurance that Florida will soon enjoy one of the best systems of highway marking in this country.

At the time All-Florida Motorist was going to press, Mr. Cannon told a representative of this magazine, then in Tallahassee, that the signs were now being made and that they would be in place before the first of next October, probably much earlier.

The signs will be enamel, baked on durable metal, and in conformity with those adopted after many conferences between highway officials of the country and automobile association officials. These conferences extended over a period of several years.

At the top of each post the number of the road will be shown, with two cross-arms following. The first cross-arm will show the distance between the beginning and end of the road. Then will follow a second cross-arm, showing the distance to the next town or city in either direction.

At cross roads or "turn-out," suitable signs likewise will be erected to guide the traveler, while dangerous curves and railroad crossings will be marked by intelligent danger warnings.

In short, the foregoing outlines the plan to be followed, but it has come about after both the motorist and the civic and highway officials of the State had delved for more than ten years persistently to this end, ways and means only standing in the light of the present achievement.

Hardly has there been a meeting of civic bodies of importance during the past five years at least when the question of more intelligent highway markers

did not run the gamut of serious discussion, and the announcement that the marking of main through highways is already in progress is a source of gratification to every citizen and visitor in the State.

Through the years before the State Road Department was in position to take up this work, the Florida Automobile Association steadily expanded its road-marking campaign, but the State is so large, new roads are being built so rapidly, and the means with which to carry on the work being limited, the need for a more extensive system of markers became sorely apparent.

Nor have the Florida State Automobile Association and the Chambers of Commerce been idly deploring the situation. They have done their bit, co-operating and commiserating from year to year in the working out of a problem that would have depleted their coffers almost overnight had they been called upon to defray the expense of the task themselves.

Since the Florida markings will be in conformity with plans worked out by the American Association of Highway Officials, they will not conflict with the sign-posting of other States, most of which are either making notable progress with the job or are seriously contemplating its undertaking at this time.

Aside from the convenience that proper road marking affords to the stranger on a strange road, people have come to realize the important part played in the daily movements of every motorist—whether he is traveling through the county where he was born and raised, or on the very road he might have surveyed and built. Most of us forget distances, like most of us forget road conditions. Thousands of us actually fail to travel in some particular direction, although a good road opens the way, as far as 100 miles from home over the period of a year—yes, often times a number of years. For this reason, unless we are kept well-informed by road-markers on highways, and by the up-to-date information on road conditions, as carried in All-Florida Motorist, for instance, we, too, frequently betray embarrassing ignorance to the stranger or tourist who expects us to know.

M. M. Smith, President of the Florida State Automobile Association, and a former Chairman of the State Road Department, expressed gratification over the news that an effective system of sign-posting had actually been launched by the State, and was outspoken in his praise of Chairman Hathaway for having attained this goal in the historic growth of Florida, as well as for "the wisdom I feel that Dr. Hathaway has shown in choosing Assistant Highway Engineer, L. K. Cannon, to direct the operation."

Contracts Awarded by State Road Department January 1, 1926—July 10, 1926

Contractor	Project No.	County	Roads Length Miles	Bridges Length Feet	Contract Plus 10%	Type
Noonan-Lawrence	51	Escambia	6.28	....	\$ 206,595.89	Concrete
J. S. Walton & Co.....	648-B	Hardee .....	....	615	83,228.09	Conc.-Timber
Chas. F. Wilmore.....	641-A	Palm Beach.....	11.36	....	86,081.38	Grade
Gillis Const. Co.....	644-A	Wakulla	8.49	....	47,367.49	Grade
L. M. Gray.....	617-618	Alachua	16.06	....	248,123.10	R. Base
Montgomery & Parker.....	633-B	Gadsden .....	....	240	39,591.47	Conc. Bridge
Peterson & Ernhart.....	672-B	Leon .....	....	1950	197,377.45	Conc. Bridge
Concrete Steel Bridge Co..	641-B	Palm Beach .....	....	237	120,766.80	Conc. Bridge
Concrete Steel Bridge Co..	656	Palm Beach .....	....	727	222,200.60	Conc. Bridge
American Bascule Bridge Corp.....	641-656	Palm Beach .....	....	120	63,573.40	Basculers
J. W. Hall	689	Alachua	1.67	....	10,599.42	Grade
H. E. Wolfe	562-A	Highlands	5.37	....	142,837.33	S. T.
C. A. Steed & Son.....	694-694-A	Martin-St. Lucie	8.48	....	61,599.45	C. G. & G.
Boone & Wester.....	693	St. Lucie	8.73	....	59,670.88	C. G. & G.
Duval Engr. & Contr. Co..	31	Hamilton	11.82	....	241,489.11	R. Base
F. S. Whitney.....	642	Putnam	10.18	....	210,025.00	R. Base
Wm. P. McDonald.....	675	Polk	5.16	....	256,969.88	S. Asph.
Noonan-Lawrence	500-A	Bay	9.65	....	334,691.59	Conc.
R. H. H. Blackwell.....	693	St. Lucie .....	....	160	80,466.96	Conc.
C. A. Steed & Son.....	694-694-A	Martin-St. Lucie .....	....	327	125,796.52	Conc.
W. P. McDonald.....	648	Hardee	1.00	....	31,363.20	R. Base S. T.
Gilbert & Hadsock.....	676-A	Levy	9.95	....	48,875.58	C. G. & G.
McLeod Const. Co.....	676-B	Levy	14.39	....	135,259.30	C. G. & G.
Peterson & Earnhart.....	673	Gadsden .....	....	20	10,727.20	Conc.
Atlantic Bridge Co.....	38	Escambia .....	....	....	28,260.98	Surfacing
Lake Worth Const. Co.....	543	Seminole	14.2	....	109,759.62	C. G. & G.
A. Bentley & Sons Co.....	621-C	Okaloosa .....	....	1363	147,295.80	Conc.
A. Bentley & Sons Co.....	621-B	Okaloosa .....	....	1568	157,361.60	Conc.
E. F. Powers Const. Co....	668	Brevard	13.45	....	119,128.58	C. G. & G.
E. F. Powers Const. Co....	564-C	Charlotte	3.93	....	42,264.98	C. G. & G.
L. M. Gray.....	595	Volusia	6.43	....	122,022.17	Rock Base
B. Booth & Co.....	53-A	Lake	7.09	....	60,252.65	C. G. & G.
Total.....			173.69	7327.0	\$3,851,623.47	

Will the Steam Engine Follow the Horse?

By A. D. STEVENS, Jacksonville, Florida, Member State Board of Engineering Examiners

FIFTY years ago at the Centennial Exposition the writer gazed with wonder at the great thousand horse-power Corliss Beam Engine in the center of Machinery Hall. This magnificent mechanism represented the then last word in steam engineering. A few yards away on an obscure side aisle stood something that looked like a cross between a hand coffee grinder with its big wheels, and a filling-station pump. The wheels were revolving and every few seconds a loud explosive crash made everyone in the vicinity jump. This was the Sombart gas engine, the first word in internal combustion engines.

The steam engine was silently driving every machine in the exposition and using about 2¼ pounds of coal per H. P. hour, while the gas engine was taking all the gas it could get just to keep itself going.

Compare their relative standing today and note their progress. From one thousand H. P. Corliss to thirty thousand H. P. Turbine for steam, and from practically nothing to the five thousand H. P. Diesel for the internal combustion motor, with fuel con-

sumption down to less than one pound for the turbine and under four for the Diesel.

A brief consideration of the principles involved will show that unless a revolutionary discovery is made the steam engine can never even equal the efficiency already attained by the Diesel engine, while there is still ample room for improvement in the internal combustion motor.

The efficiency of a heat motor depends upon the proportion of the useful energy taken out of the motor to the energy put into it.

The steam engine uses steam as the medium through which to transform heat energy into motion. To do this, it is first necessary to generate this steam from water. The mere transformation of water into steam absorbs from two-thirds to three-fourths of the total heat energy that can be put into the steam. We call this the latent heat of evaporation and so far we have found no practical method of utilizing any of it in the steam engine.

This leaves but a possible thirty-three per cent

available, out of which must come all losses from stack gasses, radiation, friction, etc. From the present outlook, twenty-five per cent would appear about the maximum attainable. This equals fifty-five hundredths pounds fuel oil per H. P. Hr. for the ultimate goal in this direction.

In the internal combustion motor, there is no such loss necessary, the gasses of combustion furnishing the medium required for turning the heat energy into motion. The efficiency depends upon our skill in utilizing the energy thus available, the only necessary losses being friction and radiation. Theoretically therefore the steam engine cannot survive.

Practically moreover, the odds against the steam engine are still greater since the efficiencies just considered are only attainable in the larger turbine units, the average steam plant under one thousand H. P. requiring from two and one-half to three pounds of fuel per H. P. Hr.

Since more than seventy-five per cent of steam plants fall in this class, they must in the end inevitably be supplanted by the internal combustion motor.

The conclusion is more obvious when we note that the efficiency of the internal combustion motor does not materially decrease in the smaller sizes. Should some not improbable development of the Diesel motor render possible an increase in capacity similar to that occasioned by the turbine in steam engineering its superiority will be complete.

On the water the motor already has practically

full possession of the field in all sizes below one hundred H. P., and is rapidly replacing the larger powers.

In ocean-going freighters probably half the ships now building are motor powered, and by the time these are all in service their marked economical superiority will render steam competition so unprofitable as to compel its retirement.

In land transportation also the handwriting on the wall is becoming visible. Motor-driven locomotives have already proven very successful, and motor trucks and buses are handling much traffic formerly hauled by steam.

It is very interesting to note what the motor has done in a field of its own creation, in which it has no competitor worthy of notice, except the horse, which is a poor substitute rather than a competitor.

Twenty years ago the light high speed multi-cylinder automobile motor did not exist, today its aggregate horse-power in this country is nearly half a billion, or over ten times all the rest of the motive power of the United States. Ten per cent of New York's automobile power could pump Niagara back over the falls.

From the foregoing review of the present situation the conclusion is inevitable, that the steam engine as an important factor in the world's industry will soon be a thing of the past. It will always find a limited

(Turn to Page 16)



Lime Rock Base on F. A. Project 31, Road No. 2. Near Jasper, Hamilton County.

Practical Highway Research

By **PROFESSOR S. S. STEINBERG**

University of Maryland, Assistant Director Highway Research Board, National Research Council

TO many persons the word "research" implies something highly theoretical and without relation to the things that are practical. Actually, most of the advantages of a practical nature we now enjoy, from automobiles to radio, are the fruits of intensive study of underlying scientific principles which we designate as "research."

The great advances made in recent years in highway engineering are due to the research work undertaken by the Federal Government, through its Bureau of Public Roads, the State Highway Departments, the universities and industrial concerns interested in highway development. To make the results of highway research known to all agencies that might profit by their application is the function of the Highway Research Board, which includes in its membership some of the most prominent scientists and engineers interested in highway matters. The application of the results of these studies has made for a more economical expenditure of the billion dollars we have been spending annually for highway improvement during the past several years.

Highway engineers are treating the highway and the vehicle as a unit and are endeavoring to determine the wear of one upon the other, so that the roads may be designed to fit the vehicle. Likewise, automobile manufacturers are modifying vehicle design better to fit road conditions.

In order properly to design a road, the total cost of highway transportation must be considered. This cost consists of two parts: First, that of the road itself which is paid for by the public, and second, the cost of operation of the vehicle, paid for by the owner. The cost of vehicle operation includes such items as depreciation, repairs, gas, oil, and tires, each of which are directly affected by the kind of road surface traveled.

Tests for Tire Wear

Since tires are an important item in the cost of motor vehicle operation, researches are under way to determine the relative effect of different road surfaces upon tire wear. In these tests, both cord and balloon tires are used at the inflation recommended by the manufacturers. The car is run up and down selected level stretches of different road types until the vehicle has covered a distance of 500 miles, after which the wear of the tires is determined. Thus far it has been found that tires wear the least on concrete and brick roads, the loss in weight of each tire on these surfaces being about one ounce for a 500-mile run. The tire wear on gravel roads is found to be from 2 to 7 times that on concrete or brick, while that on macadam varies from 10 to 50 times the wear on concrete or brick, depending upon the condition of the surface.

The results also prove that front tires wear less than rear tires, the amounts being 50 per cent to 75 per cent less. The relatively greater wear on rear tires is due to the bounding and spring of the rear wheels when traveling over rough surfaces. Experi-

ments also show that when we start our cars from rest the rear wheels exert a downward kick on the pavement ranging from 100 pounds to as much as one-half a ton. This blow must be resisted by the rear wheels and axle every time the vehicle is started from rest.

Gasoline Consumption Tests

Other investigations are being conducted to determine the relative consumption of gasoline and oil on different types of roads. As a result of these studies, it has been found that the increased consumption of gasoline required to travel by ordinary dirt roads costs the motorist as much as if he had to pay an additional tax of 24 cents a gallon on gasoline. Even good gravel roads impose an additional expenditure equivalent to a 9 cent tax. Compared with the tax imposed by bad roads, the gas tax paid for highway improvement is truly insignificant.

Wind Resistance

To determine all the elements of the resistance to motion offered by road surfaces, and the resulting wear upon the vehicle, it is necessary to know the effect of the wind on a car. Due to their variability, the natural winds could not be used in experiments to determine this element of atmospheric resistance. Consequently, a wind tunnel large enough to test full-sized cars was designed and built. Artificial wind velocities, ranging from 10 to 40 miles an hour, are produced in the tunnel with fans driven by electric motors. Thus far a number of standard makes of automobiles, including the different types of bodies, have been tested in the tunnel, and the wind resistance, as well as the horse-power required to overcome it, has been determined for each type of car at varying speeds. The results show that when you drive at 35 miles an hour you use, on the average, 8 horse-power to overcome wind resistance. If you reduce your speed to 25 miles an hour, you save 5 horse-power.

Cause of Cracks

Considerable attention is being given to determining the causes of cracking in concrete roads. The extent of cracks in a slab is dependent upon the underlying soil, the quality of the concrete, and the loads the pavement must bear. When a vehicle passes over a concrete pavement, the slab is deflected. The result is that under traffic the road is subjected to a wave action, the slab rising and falling with each passage of a wheel. On roads under heavy traffic at high speeds, this motion may be repeated many hundred times an hour.

Experiments have been conducted in the laboratory simulating these field conditions, with the discovery, that concrete is subject to fatigue, which, in many respects, is analogous to muscular fatigue in human beings. After continued rapid application of load, the normal properties of the concrete are overcome and the fatigue limit is reached. The result is a break in the concrete and the appearance of a crack in the road. The analogy to muscular fatigue is further evidenced



Road No. 2, F. A. Project 31, Hamilton County—Maintenance Gang Constructing Shoulders and Ditches.

by the fact that if before failure the concrete is permitted to have long periods of rest, it recovers its ability to resist the applied forces and the fatigue limit, or life of the slab, is extended.

The stresses produced in roads by traffic, as well as the deflections and changes of length they cause, are measured by specially constructed instruments installed in the road. An analysis of these measurements serves to determine the proper thickness of the road slab in its different parts to support the traffic the road must carry.

A New Cement

As a result of research, there has recently been introduced a new kind of cement, which, when used in concrete, has the property of developing greater strength in 24 hours than is developed by the ordinary Portland cement in 28 days. This opens up remarkable possibilities in road construction. Whereas, by use of the ordinary cement a road must "cure," or acquire strength, for 14 days after being laid, during which time it is not permitted to carry traffic, it may now be possible to build a portion of a concrete road on one day and open it to traffic the next. Studies are now under way to determine more fully the physical properties and characteristics of this cement.

Super-Highways

Statistics show that of the 26 million motor vehicles in the world, we in the United States own about 80 per cent. They further indicate that 60 per cent of our twenty million vehicles are owned in

cities. Traffic counts have revealed that at time of peak loads on certain highways near large cities cars travel past a given point at the rate of 1,600 to 2,000 vehicles an hour. Due to traffic congestion on rural roads, super-highways are under construction or being planned in many sections of the country. These provide for four or more lanes of traffic moving abreast, permitting slow and fast traffic to sort itself, and thereby increasing the capacity and safety of the highway. Future developments may also make it necessary to provide separate highways for freight and for passenger vehicles. It is hoped that the super-highways will restore the pleasure once realized by city dwellers in riding on the main rural roads on Sundays and holidays.

Many persons are of the opinion that most highway accidents occur at grade crossings, or on sharp curves in the road. It may surprise some to learn that a good majority of the accidents occur on straight roads. The explanation is that even careless drivers exercise some degree of caution at crossings and curves, while the straight, smooth stretch of road serves as an incentive to most drivers to speed and to pass vehicles traveling at a slower pace.

As highway transportation develops, the problems that confront the highway engineer increase in number and complexity. Basing his solutions upon the foundation of scientific research, the engineer may face future developments with confidence; for research make evident the wastefulness of the pioneer, and points the way to economy.

Engineer's Compensation

VERSUS LAW OF SUPPLY AND DEMAND

By HAROLD ALMERT

ENGINEERS want to earn more money and many are wondering why they are not earning more. Let's get down to brass tacks and dig out some of the fundamental causes that are retarding their financial progress.

When there are more Engineers than there are positions in the lines of work that engineers are fitted to do, an employers' market exists. When the supply is greater than the demand the price is low. When the supply is less than the demand an Engineers' market exists and the price paid goes up.

Only if and when the supply and demand are well balanced or normal is the price paid for services normal and based on value of the services rendered.

If all Engineers were to form a union and absolutely refuse to work unless a certain arbitrary scale of wages was paid, wages might be higher, but violence would have to be resorted to from time to time to prevent others doing or attempting to do Engineers' work and many Engineers would have to be without employment where employers would not or could not pay the scale asked.

This method might help the lazy or poorly qualified Engineers but would be a distinct detriment to the better qualified and willing workers. To be made effective the supply of Engineers would have to be decreased or the output of Engineers would have to be restricted if an artificial increase in salary is to be created.

In the building trades, because of restrictions or absolute prohibition of apprenticeship put into effect by the union five years or more ago, we now have between 25 to 30 per cent less skilled building mechanics than we had five years ago. The supply is materially less than the demand and because of restricted output the amount of work done is less and the wages paid are much higher.

Should Engineers, would Engineers, resort to such artificial and questionable methods to increase their compensation? The answer is obviously "No." Not when there is a much better and more ethical way to achieve the same end.

What are some of the fundamental causes for the over-supply, and what are some of the remedies?

1st—There are many men engaged in Engineering work who are not Engineers and never will be. If these technicians will make a thorough vocational analysis of themselves they will find that they are by nature much better fitted for some other line. By also making an analysis of various vocations they will find their right line, the only one in which they have a real chance to succeed, and if all did so there would be many less Engineers and better pay for those remaining.

2nd—By making a thorough analysis of themselves and the vocations the Engineers would find what is retarding their improvement and progress, and if

Engineering is their right line they will be genuinely interested and it will be no hardship to take up a study of those things necessary to improve and progress.

3rd—There are too many men in executive positions involving Engineering who are not Engineers. Not being Engineers these executives have to depend on Engineers for correct decisions on or solutions of technical matters. If and when the Engineers balance their training and experience by becoming just as good business men as they are Engineers, then those choice executive positions will not only be open to Engineers, but they will fill them better than the business executives without Engineering knowledge who now occupy them. This will create more positions for Engineers and increase the demand for the present supply, resulting in a higher return or pay for all and particularly those of executive ability.

4th—The field open to the one-sided, highly-trained and specialized Engineers is obviously limited and the supply is greater than the demand, but if and when the Engineers balance their knowledge with the broad and sound principles of business management the field that will be open to them will be multiplied many fold, and in their climb many will soon get away from strictly Engineering work and gradually get into management and finance.

5th—All Engineers who analyze themselves and the vocations will not become the executives or captains of industry, and many would not be happy if they could or did. There is a great variety of calibers of men but there is a place for each and every one. If by nature you are a detail man you would be unhappy and unsuccessful in an executive position. If you are by nature a big caliber man you would be equally unhappy and unsuccessful in a detail man's job.

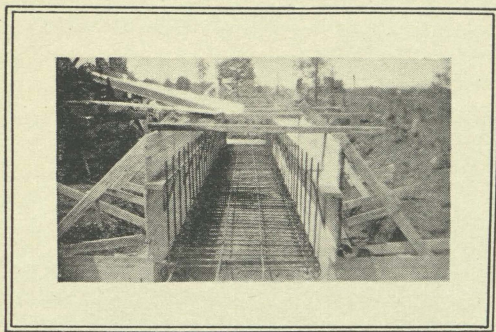
Find your caliber and place, then develop yourself intensively for that place. By so doing you will soon find the compensation adequate, and what's more, you will be happy and contented in your work. Then you will be a real success.—Professional Engineer.

HOW ABOUT YOUR OWN?

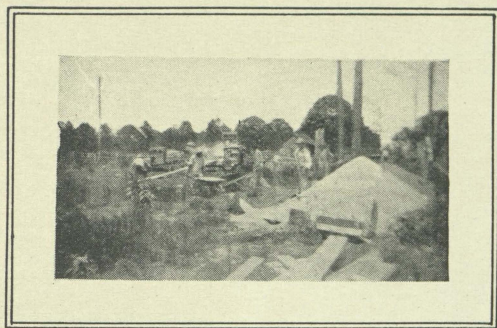
If there's one thing that's bound to catch the eye of any driver, no matter how unobserving otherwise, it's a wobbling hind wheel of a car ahead or the crippled front "roller" of a machine approaching. All who witness these premonitions of danger prophesy trouble ahead for the owner.

But the owner seldom learns the truth about the condition of his own wheels because he is busy speculating about the crooked courses the wheels of passing cars are taking. Car owners who feel that the wheels are of some account make it a rule occasionally to jack up each wheel in turn and spin it.—Exchange.

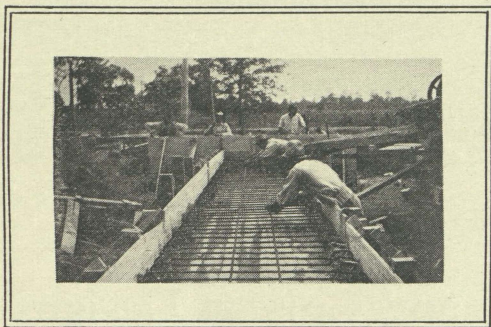
Five stages in constructing a concrete culvert



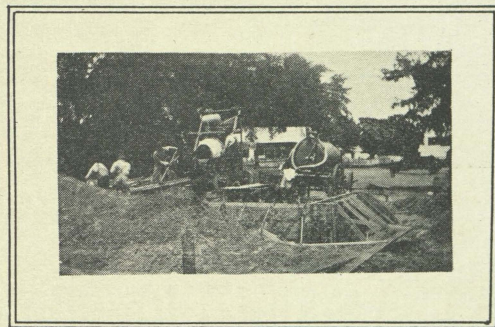
*Forms and steel ready
for pouring footing*



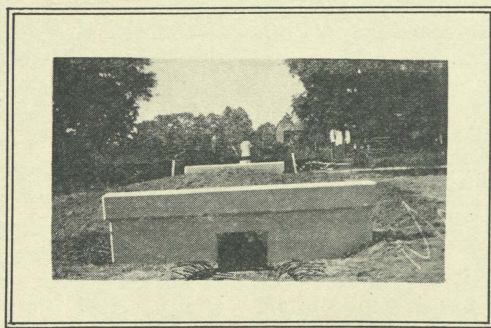
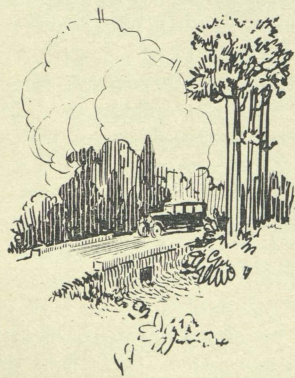
Pouring footing



Placing steel in barrell



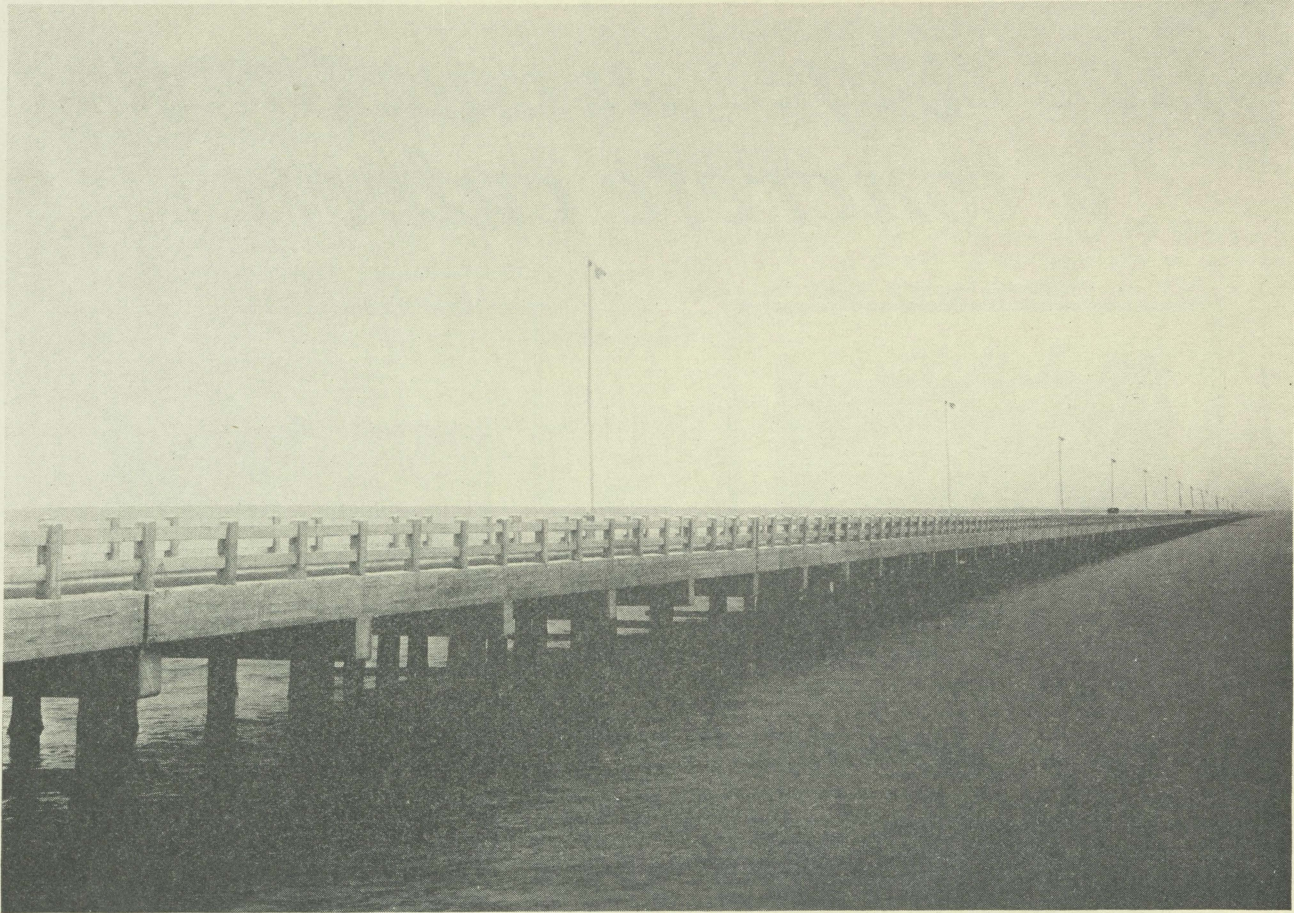
Pouring barrell and headwalls



Completed



FLORIDA



A View of the Famous Gandy Bridge Across Tampa Bay Between Tampa and St. Petersburg. A Privately Owned and Operated Toll Bridge.

The Standardization of Bridge and Culvert Designs

By J. H. AMES, Bridge Engineer Iowa Highway Commission

THE possibility of completely standardizing bridge and culvert designs to a point where one may, by the insertion of a few dimensions in blank spaces provided on a standard drawing, obtain a complete design to fit a given set of field conditions has attracted the attention of many of those interested in highway work, and has long been the Utopian dream of the bridge designer. Every bridge department looks forward to the time when it may have available for instant use a complete set of standards which will cover in detail almost any situation that may arise. We no doubt come naturally by this illusion through inheritance from our predecessors, the railroad engineers, and by example from the commercial world where we are taught that increased production is obtained to a considerable extent by more complete standardization. The same idea was capitalized by some bridge companies operating extensively before the advent of highway departments, when they standardized certain types of bridges to such an extent that it was commonly said they sold bridges by the mile and cut them off to fit

the stream. Visible examples of that kind of standardization are still with us here in the Middle West and no doubt to some extent in every State in the Union.

Despite the fact that engineers have been attempting to standardize highway bridge and culvert designs for many years, the realization of the dreams of complete standardization as a solution of all the designing problems seems far from fulfillment in the bridge department of the average state, and the problems of the individual design for the specific location still command major attention.

Practically every type of bridge and culvert design is susceptible of some standardization, and to that extent the preparation of tabulated design data and standard plans is wise in the interest of efficiency and economy. Likewise it is conversely true that every type of design has decided limitations beyond which it is determined and oftentimes dangerous to proceed.

The extent to which standardization is applicable to bridge and culvert design is dependent on the type of structure under consideration and the local conditions within the State. Little, if any, standard-

ization seems practical for such complex types of structures as reinforced concrete arches, viaducts, and others of a like nature, although parts of structures of such types may be standardized effectively, and information of value in the preparation of plans and estimates prepared in detailed form. Within certain limits it is entirely practical and desirable to standardize such types of structures as girders, slabs, beam spans, trusses, culverts and others. The superstructures of such structures are particularly adapted to standardization, and with the exception of unusual roadway widths, skew designs and special conditions, the standard plans may be developed to the fullest extent.

The conditions as to plans, lettings, methods of receiving proposals, construction in the field, and other considerations within the individual state must dictate to a considerable extent how standard plans may be developed and used.

While the production of complete standards or tabulated data of a detailed nature is necessary and desirable in every bridge department, it does not follow that the promiscuous use of such standards without an attempt to adapt them to the given field conditions is either wise or efficient. It is almost pathetic to witness to what extent some engineers and designers are slaves to the standard habit, particularly where the field conditions necessitate the preparation of an individual drawing or set of drawings to adequately meet the situation. They will undergo great difficulties in modifying the road grades, changing the alignment of the road or course of the stream, and sometimes in desperation even relocating the road itself, to bring the design within the limits of some inflexible set of standards. In the hands of such an engineer standards are a positive detriment to the production of a proper design. Invariably when the engineer or department attempts to distort conditions to fit the existing standards the result is the creation of construction which is awkward and stiff and which stands out like a sore thumb. Such a structure does not reflect any high degree of engineering skill and judgment and causes the layman to wonder if after all professional services are necessary under like conditions. In a day's trip in any state, county or municipality afflicted with "standarditis," one may observe all too many attempts to bend the situation to fit the standard, rather than to design a structure which will fit into the general scheme of things in a logical and proper manner.

Fortunately the tendency toward the unwise use of standards is confined largely to the less expensive structures and those which a kind Providence and changing traffic conditions will in time obliterate. Nevertheless, the greater part of our expenditures for drainage structures are for those of relatively short span, and it therefore behooves those responsible for the production of structures, which in themselves seem relatively unimportant but which are large in the aggregate, to design and construct them with the exercise of the same skill and care as in the design of the larger structures. Surely if a situation in the field demands that a design be prepared, it should be prepared for that particular situation alone, and not be left to fate that the

proper standard will be available and applied when its construction is undertaken.

Standards, to be of the greatest service in the office and field, must be complete and in detail, yet possess some flexibility and be susceptible of some modification and change when occasion demands it. Too often we find standards produced which are hidebound and rigid to the extent that all initiative and resourcefulness of the individual designer is lost. At best they can be but a set of designs prepared to meet average or ordinary conditions, and to serve as a guide to the designer for the production of individual designs. They are most useful in this capacity and when so considered they are invaluable to every bridge department.

Iowa began the preparation of standard designs in 1905, and in that year issued a manual containing a more or less complete set of reinforced concrete box culvert standards. These early standards seem rather crude in the light of our present knowledge, but they were then considered sufficiently all-inclusive to cover all future conditions of use. From time to time thereafter these standards were revised and others added until we now have a rather complete set covering the commonly used widths of roadway and span lengths for the superstructures and substructures of all of the ordinary types of bridges and culverts used in this State. Like most other States, we have not been altogether free from the evils attendant upon the too general use of standards, but we have attempted to avoid this difficulty in so far as practicable by the preparation of an individual design for each bridge and culvert to be constructed or rebuilt, irrespective of size. These individual plans are prepared in complete detail for each location, using the standards in the drafting room as designing guides. During the past 12 years a total of 13,632 individual designs, estimated to cost over \$24,000,000, have been prepared by the bridge department. By the use of a Vandyke process in reproducing positive prints from which the information of a detailed nature and applicable only to the individual design has been eradicated, and by the use of a system of indexing, it has been possible to utilize the same set of drawings for several locations. To this print, which serves as a negative, is added the situation plan, title, and all other data applicable to that particular bridge, or culvert. In this manner it is possible to very quickly produce a complete set of plans designed to fit the existing field conditions given in the field notes and at a very nominal expense. The one criterion is the production of a design which will meet the field conditions, and we often find it impractical to use existing drawings. Under such circumstances we must prepare a new set of plans to meet the situation at hand.

It would appear that there are two distinct and legitimate uses for a complete set of standards. One is to co-ordinate and expedite the preparation of individual designs, and the other is their use in the preparation of preliminary estimates for comparative purposes. Without standards in some form in the designing room there would undoubtedly be much confusion of ideas, resulting in lost motion and delay. The individual designer should, however, be given to understand that he may be permitted to deviate

from the standards wherever and whenever true economy will result, or other occasion legitimately demands it. For the speedy preparation of preliminary estimates, standards with tabulations of quantities for all ordinary conditions under which they may be used are invaluable.

It is a difficult matter to keep a set of standards at all times in accordance with the standard specifications and abreast of the times. With the ever-changing conditions of loading, roadway widths and other conditions imposed by traffic, as well as the new developments in the specifications themselves, brought about by experience gained from former designs and research, it is extremely difficult to keep the standards and specifications in perfect balance. One should, however, always be interpreted in the light of the other, and the best that can be expected is that they are at all times in substantial accord. If the standards are used principally in the designing room, minor modifications or additions may be made from time to time to take care of specification changes, and at no time will wide discrepancies between the plans and specifications result. It is reasonable to assume that the future will bring even more radical changes in the specifications than have resulted in the past, so that the process of revision will never end.—American Highways

Oil is the Magic

The tests by the Society of Automotive Engineers to determine the most economic fuel have had very valuable "by-products," according to President Harry L. Horning in an address in Chicago. "It has been learned from the research work," he said, "that we have been trying to lubricate with mud. When oil from the cylinder walls is analyzed it is found to be diluted by the products of combustion and partial combustion, wearings from the cylinder walls, carbon, and gasoline or kerosene. We shall see wide adoption in the next year or two of means for cleaning engine oil as it is being used. We have found that by direct lubrication of the cylinder with clean oil we could cool the pistons to such an extent that a badly-knock engine ceased to knock. When some means of putting clean oil on the bearing surfaces is adopted generally it will not be uncommon for an engine to go 125,000, 150,000 or 175,000 miles without having a bearing adjusted."—Motor Chat.

Simple and Easy

At a big party in London, a woman of the newly rich and ostentatious class was sitting beside the wife of a prominent labor leader. The former began to talk about her jewelry. "I clean my diamonds with ammonia," she said; "my rubies with Bordeaux wine, my emeralds with Danzig brandy and my sapphires with fresh milk. And you, Mrs. Blank?" she asked, turning to the labor leader's wife.

"Oh, I don't clean mine," said the latter airily. "When they get dirty, I simply throw them away."—Boston Transcript.

We can't recall ever getting any cheerful news out of one of those envelopes with a sun parlor in front.—Toledo Blade.

Roads

By GEORGE MATTHEW ADAMS

ROADS have always interested me. Perhaps mostly because they are the means whereby mankind has been able to get together and institute growth.

All over the earth roads tell the story of advancement and civilization. They lead to cities, to farms, to factories, to every enterprise in fact of which man is a part.

Like the network of nerves and blood vessels in the human frame, so are the roads in the living framework of a nation.

Just the minute that you are located off a road, you create a problem for yourself and for those who have to do with you.

The road to-day has reached its highest perfection. An automobile has beaten the fastest train from San Francisco to New York City. How well I remember when a ten or fifteen mile drive with a horse was a task for a day. Now we take more than that while we are waiting for our dinner to be cooked.

Marvelous has been the progress of the road, and mankind has advanced with it.

But the greatest appeal of any road lies in its poetry, its romance, its intricate shades of beauty.

I recently took a thousand-mile drive in my car through the great State of New York. I purposely chose a route away from the main cities, taking a northern passage to Buffalo and a southerly way back. And what magnificent scenery and roads! I almost pitied those—including myself—who day by day entered the whirlpool of the city's turmoil.

There were winding roads to the top of great hills, and then into valleys, across level territory, along canals and railroads, and through quaint little towns that were a hundred years or more of age.

It was Tagore who spoke so beautifully about the road being a part of the destination itself.

Fine, beautiful roads are as accurate an indication of a nation's character as its people. And the better the roads, the better the people are sure to be.

The measure of a nation's civilization, its advancement in education and in material things, can to a large extent be judged by the condition of its highways. Here and there some genius may rise above his surroundings and become a great leader though born amid the dirt and squalor which are usually associated with impassable mud roads or bottomless sand roads. But, broadly speaking, a people can rise no higher than the condition of their highways.—Manufacturers' Record.

Likee Workee

A Chinese newspaper published this letter from an applicant for work: Sir: I am Wang . . . I can drive typewriter with good noise and my English is great. . . . My last job has left itself from me, for good reason that large man has dead. It was on account of no fault of mine. So, honorable sirs what about it? If I can be of big use to you, I will arrive on some date that you should guess.—Squadron News of the Far East, Cavite, P. I.



Project 696, Road No. 8—St. Lucie County.

Six Characteristics of a Good Driver

Washington, D. C.—In line with its policy of developing a code of motoring ethics to offset and replace the plethargy of over-regulation, the American Automobile Association announces the verdict of a jury of nationally known traffic and safety experts on "What are the characteristics of a good and safe driver?"

An analysis of the opinions submitted on this vital problem disclosed that the seven men to whom this question was submitted by Thos. P. Henry, President of the A. A. A., are in accord on six major essentials, as far as good driving is concerned. These are:

1. The good driver has a high degree of self-control at all times, this control manifesting itself in various ways.

2. The good driver always maintains his car in such shape that it responds easily and quickly, thus assuring control of the car as far as the purely mechanical equation is concerned.

3. The good driver regulates his speed in accord with the conditions of the road over which he is traveling, and never travels at such a rate that he cannot stop it within the "clear course" ahead.

4. The good driver invariably exercises due regard for the rights of others and always applies the simple axioms of courteous behavior.

5. The good driver accepts the safety of the pedestrian as a primary consideration.

6. The good driver keeps his mind on the road ahead, as day-dreaming or chattering at the wheel causes many more accidents than are caused by bee stings.

In broadcasting the verdict, the A. A. A. also announced the names of the jury to which the matter was referred, as follows:

Ray McNamara, service engineer of the Chrysler Motor Sales Corporation, who has driven more than 1,000,000 miles without an arrest, without an accident and without an insurance claim of any kind.

Bennett Hill, one of the greatest speedway drivers of the age.

George M. Graham, Chairman of The Traffic and Safety Committee, National Automobile Chamber of Commerce.

Colonel A. B. Barber of the United States Chamber of Commerce, also Director of the Hoover Conference on Street and Highway Safety.

Dr. H. C. Dickinson of the Heat and Power Division of the Bureau of Standards, who has made a special study of safe driving.

Dr. F. A. Moss of George Washington University, a nationally known psychologist.

Officer E. W. Smith, who for ten years has regulated traffic at one of the most congested intersections of Washington, and who is now on duty at the White House.

"If you are hitting on all six," said Mr. Henry, "you are doing your part to promote safety, in so far as your personal responsibility is concerned. The points stressed are not intended to be exhaustive, but they certainly embody some of the main moral and physical factors involved in safe and sane driving. By taking them to heart the average motorist can do much to relieve himself and other users of the highway of the multiplicity of laws and regulations, which instead of solving the accident problem, is proving a serious impediment to progress. As I see it, the universal acceptance by the motorists of a high degree of personal responsibility is fundamental."

THIS CLASS IS ALWAYS WITH US

If a drunken automobile driver doesn't deserve a severe sentence, is there any motorist who does?

We raise this question in view of the fact that suspended sentences and fines have of late become the usual penalty imposed upon offenders of this class.

An automobile, driven by an irresponsible chauffeur, is nothing more or less than a deadly weapon.

If a bibulous citizen should suddenly decide to try target practice in the downtown district with a high-powered rifle, what judge would dare to let him off with a slap on the wrist?

Yet it is questionable whether a whisky-crazed individual of this type would be a greater menace than a drunken driver.

To let intoxicated motorists off with a reprimand and a suspended sentence and at the same time fine a citizen for failing to park close enough to the curb, is to make "justice" ridiculous.—Minneapolis Star.

"Are you the plumber?"

"Yes, mum."

"Well, be careful when you do your work. My floors are all highly polished."

"Oh, don't worry about me slippin', mum. I've got nails in me boots."

Teacher—"Now, Willie, take the words plane, saw and hatchet and make a sentence containing all three."

Willie—"That's easy. The plane chicken saw an egg and tried to hatchet."

Such a Waste

"Fadder," said Ikie, "give me a penny."

"Vot you want mit a penny?" asked his father.

"To buy an all-day sucker."

"Vat, an all-day sucker and it's 3 o'clock in the afternoon already?"

All the average man expects his wife to be is a sweetheart, a valet, an audience and a nurse.—Chicago Journal.

Safety First

The aviator's wife is strange

In one way, beyond doubt;

Her heart rejoices when she sees

Her husband down and out.

—R. M. in the Boston Transcript.

"Idiotorial"

Our Roads; Long May They Wave

The Government has appointed a committee of swivel engineers back in Washington to investigate Western roads. Their motto is, "My country—right or wrong—and neither are we." This little group of roller-top highway builders are to decide whether or not Federal aid will turn to lemonade if left standing too long.

Just now roads are in the public eye—that is, all except the dusty ones, which are mostly in the motorists' eye.

Rocky Roads Are Dublin'

The worst crime waves are those on our highway surfaces. While Congress hurriedly investigates, with deliberation, Mother Nature continues marcelling our highways. The rainy weather is leaving no stone unturned. Marcellled thoroughfares are not passing fads. They are deep-rutted institutions.

It takes even less than an investigation committee to find out that an uneven road has bumps in it. To locate the bumps requires no special training.

Straight and Narrow; Mostly Narrow

Furthermore, the committee can go back and report that our highways are all full and a yard wide. Congress will then pass a bill reducing distances between places by cutting down the mileage mark on road signs.

But there is an end to all things, especially blind alleys. If the Government wants more information on our roads, we want more paving on them. Congress holds out for concrete, and the committee recommends asphalt—to us it doesn't macadam bit of difference.—National Motorist.

When you take his arms away from him, you don't leave a Chinese President a leg to stand on.—Manila Bulletin.

Not Shy About It

Visitor—"I suppose they ask a lot for the rent of this apartment?"

Hostess—"Yes, they asked George seven times last week."—Western Christian Advocate.

WILL THE STEAM ENGINE FOLLOW THE HORSE?

(Continued from Page 7)

use under special conditions, but no engineer of today even would be warranted in advocating a steam plant of any considerable size without the assurance of an ample supply of cheap fuel during the lifetime of the plant.

The study of the steam engine would thus seem to have become more an academic than a practical question since it appears impossible to increase its efficiency to that already reached by its competitor and the time thus spent could be much better employed in developing the latter.

The steam engine is fast following the horse, and it behooves engineers to recognize this fact and keep up to date.—The Florida Engineer and Contractor.



State Road No. 15—North of Wall Springs. Built by Pinellas County.

General Information Motor Vehicle License Law

Furnished by Ernest Amos, Comptroller, Tallahassee, Florida

Application blanks may be obtained from any bank, Clerk Circuit Court, Tax Collector, Sheriff or County Judge, or by writing to the State Comptroller, Tallahassee, Fla., and at local agencies.

If you desire tags promptly, answer all questions. Frequently the very question left blank is the one necessary to know before proper registration can be made.

Write all names and addresses plainly.

Factory rating of weights and capacity will govern unless the owner can furnish evidence to contrary. Major fractions count as even hundreds; for example, a machine actually weighing 1,560 pounds would be classed as 1,600 pounds; one weighing 1,540 pounds would be classed as 1,500 pounds.

Only one tag is required and that will be placed on the rear of the car.

Motorcycle sidecars are not required to have tags.

Lost or mutilated tags may be duplicated. There is a special blank for use in applying for duplicate tag. The law requires a fee of \$1.00 for duplicate tag or certificate.

Non-Resident Exemption.—Bonafide residents of other States temporarily in Florida, whose motor

vehicles are properly registered and equipped with license tags of their home State for the current year, will be exempt from registration and license in Florida, for the same length of time that the home State of the non-resident would exempt under like circumstances a resident of Florida. See list of States with non-resident exemption. Particular attention is invited to the fact that no exemption can be made, unless the motor vehicle of the non-resident has the license tag of his home State issued for that particular car, and which tag has not expired. The law which previously granted a two months' tag to a non-resident has been repealed. Therefore, if a non-resident wishes to register his car in Florida and obtain a Florida tag he would obtain such tag under the same rate as a resident of Florida.

RECIPROCITY STATES

Compiled by Research Dept. American Automobile Association. Revised to July 20, 1925.

Showing the period during which the various States grant to non-residents the same privileges as to their own citizens, providing the visitor's State

extends reciprocal privileges to residents of the State in question.

"Reciprocal" means the extension of these privileges without time limit.

Alabama—Reciprocal.

*Arizona—4 months.

Arkansas—90 days, provided statement is made within 30 days.

California—6 months, provided statement is made within 10 days.

Colorado—90 days, registration required with Secretary of State.

Connecticut—15 days or part of days.

Distriet of Columbia—Reciprocal.

Delaware—Reciprocal.

Florida—After January 1st, 1926, full reciprocity.

Georgia—30 days.

Idaho—Reciprocal, except trucks of one ton or more capacity.

Illinois—6 months.

Indiana—60 days.

Iowa—90 days.

Kansas—60 days.

Kentucky—Reciprocal.

Louisiana—90 days.

Maine—Reciprocal.

Maryland—90 days.

Massachusetts—90 days.

Michigan—90 days; 10 days for commercial vehicles.

Minnesota—Two months, provided application for permit is made within 10 days; otherwise vehicles are taxed after 10 days.

Mississippi—30 days.

Missouri—90 days.

Montana—Reciprocal.

Nebraska—Reciprocal.

Nevada—3 months, provided vehicle is registered within 10 days.

New Hampshire—20 days.

New Jersey—15 days.

New Mexico—3 months.

New York—Reciprocal.

North Carolina—60 days.

North Dakota—Reciprocal.

Ohio—Reciprocal.

Oklahoma—60 days.

Oregon—3 months, provided vehicle is registered within 72 hours.

Pennsylvania—Reciprocal.

Rhode Island—30 days.

South Carolina—30 days.

South Dakota—Reciprocal.

Tennessee—30 days.

Texas—30 days; may be extended to 90 days on payment of \$1.00.

Utah—90 days.

Vermont—3 months.

Virginia—Reciprocal.

Washington—Reciprocal.

West Virginia—3 months.

Wisconsin—Reciprocal.

Wyoming—90 days.

*In Arizona, a non-resident is permitted to operate a motor vehicle for a period of 4 months, without registration, but must obtain operator's permit within 30 days.—All Florida Motorist.

Compensation

There are two kinds:

1st—Money sufficient to live respectably and comfortably, but not lavishly, should be sought for.

2nd—Accomplishment. That is by far the greatest compensation. The satisfaction of achievement is in the long run the only real compensation after a competence has been reached.

There is no compensation or satisfaction and no happiness from the accumulation of great wealth for the sake of money. Any man who starts out with that end in view soon learns that mere money brings no happiness.

Success is the greatest compensation and is not measured in dollars. Obviously no one is happy or contented without a competence.

To be worthy of a competence you must use diligence to get into the right line of endeavor for which you are naturally fitted. If you don't you are not entitled to a competence and will not earn one. If you do you will be successful and a competence is assured.

Scientists, educators, etc., who are in their right line, are the most richly rewarded class, though poorest paid.

Man is made or unmade by himself; in the armory of thought he forges the tools with which he builds for himself heavenly mansions of joy and strength and peace or the weapons with which he destroys himself.—Professional Engineer.

MOTOR VEHICLES IN GREAT BRITAIN

The total gross receipts shown in the British Ministry of Transport's motor taxation return for the period Dec. 1, 1925, to Feb. 28, 1926, amounts to £11,964,418, of which approximately £25,000 was refunded in respect of the surrender of 3,417 licenses. The total number of motor vehicles, including tram-cars and trade licenses, in respect of which licenses were current on Feb. 28, 1926, may be taken as 1,177,000, including 498,000 cars taxed on horse power, 339,000 motorcycles; 232,000 commercial goods vehicles and 77,000 motor hackneys. As compared with the corresponding period, 1924-25, the total number of licenses current for this year shows an increase of 110,000. The increase in the number of cars taxed on horse power is 72,000, the number of motorcycle licenses has increased by 10,000, commercial goods vehicles by 25,000 and motor hackneys by only 1,000. The average receipt in respect of whole year licenses for cars taxed on horse power is £14/17/0 as against £15/8/0 on the previous return and, for commercial goods vehicles, £21/0/6 as compared with £21/1/6. Road locomotives have increased from 1,378 to 1,398. Horse-drawn vehicles, private and hackney, have decreased from 114,554 to 96,784.—Roads and Streets.

Misdirected Endearments

He—"I always kiss the stamps on your letters, because I know that your lips have touched them."

She—"Oh, dear, and to think that I dampen them on Fido's nose!"—Union Pacific Magazine.



Seminole Bridge Over Long Bayou. State Road No. 15, Pinellas County.

The Field Man

A Mighty Force in the Industrial World

The builder has always been an important man in history. His works tell us of the power of the Pharaohs, the love of beauty of the Greeks, the splendor of Rome, the religious fervor of the Middle Ages. He built pyramids and palaces, canals and cathedrals, reservoirs and roads. He built well. Time has damaged his works but has not subdued his skill.

His direct heir to-day is the field man in construction and industry. And a worthy heir he is.

Do you want a bridge across a chasm? He'll tackle the job, no matter how hard.

Do you want to dam a raging stream? Just give him the lines; he will check the torrent.

Do you want a skyscraper? Just tell him where and when.

Do you want to move mountains of dirt, or rock or ore? Drop him a word and watch him collect an army of steam shovels, drag lines, derricks, ditches, loaders, dump cars—a mighty array of digging, breaking, lifting, carrying machines that glory in hard work.

And with them, guiding them in their herculean tasks, the field man carries on the never-ending work of the builder.—Successful Methods.

The Highway Builder

Highway building, which in the old days was a haphazard enterprise, is to-day not only a business of gigantic proportions, but an enterprise of orderly and scientific procedure. As much preliminary study of requirements, as much thought in planning, and as much care in design are now devoted to the building of a system of roads as are, as a matter of course, given to the construction of a modern skyscraper.

In determining the requirements of a road, traffic surveys give the highway builder a starting point for his design—the load his road is carrying to-day. A careful study of the situation will indicate the possibilities of traffic divergence to the road after improvement. But by co-ordinating one road with another, traffic may be equalized and excessive loading avoided, in the interest of economy. That the study of highway co-ordination is a calling in itself and of tremendous importance to others besides the road-builder is indicated by the many regional planning associations that have sprung into existence within recent years.

The actual design of a system of roads in all its various details is the succeeding and present step. Many factors are involved. Help and guidance for their solution come from many different sources.

(Turn to Page 21)

TRANSACTIONS OF DEPARTMENT AT QUARTERLY MEETING

(Continued from Page 3)

quested and authorized to secure by purchase or condemnation the lands necessary for a right of way for said road along the line shown on said plat.

Be it further Resolved, That said County Commissioners be and they are hereby authorized to use the name of this Department in any condemnation proceedings necessary to carry out the purposes of this resolution, or to proceed in their own name as authorized by law; and

Be it further Resolved, That in the event that they shall elect to proceed in the name of this Department, that their attorney be and he is hereby authorized to prepare, execute and file all necessary pleadings, affidavits and documents in connection therewith.

ROAD 1—Perdido River Bridge

Upon motion of Mr. Bayliss, seconded by Capt. Hillman, the following resolution was adopted:

Resolved, That the Chairman be and he is hereby authorized to advertise for bids for the construction of the bridge across the Perdido river as soon as assurances can be had from the State Highway Department of the State of Alabama that that state is prepared to construct the bridge across the branch of said river within said state, as well as the road connecting same; and that the Chairman be requested to take up this matter with the Alabama authorities immediately.

ROAD 58—Gadsden County

A delegation from Gadsden county, consisting of Messrs. W. T. Doss, I. L. Gunson, L. A. Gray and Rev. W. J. Gray, appeared before the Department with reference to the location of State Road No. 58, in said county. The delegation was informed that the Department was not at this time authorized to construct said road and is not now in a position to discuss its location.

ARCHES OVER STATE ROADS AT POINTS OF ENTRY INTO STATE

Messrs. T. J. Brooks and P. S. Taylor, representing the State Agricultural Department, appeared before the Department and outlined a proposal to place arches and booths at the points of entry on State roads entering Florida, and to place there a man to give out literature and information of a State-wide nature. The Department was requested to co-operate in the movement to the extent of constructing the necessary arches.

Upon motion of Mr. Bayliss, seconded by Capt. Hillman, the following resolution was adopted:

Resolved, That the Chairman and State Highway Engineer be and they are hereby authorized to secure information as to the advisability and cost of constructing such arches, that they prepare a suggested design for such arches and that opportunity be given the states adjoining Florida to participate in their construction.

ROAD 8—Highlands County—Project 630

Mr. M. F. Meyer, representing Meyer Construction Company, the contractor on Project 630, presented to the Department the contractor's claim for additional compensation in connection with said contract.

Upon motion of Capt. Hillman, seconded by Mr. Schilling, the following resolution was adopted:

Resolved, That the State Highway Engineer be requested to make an investigation of the claims of Meyer Construction Company and report his findings and recommendations to this Department.

OKEECHOBEE COUNTY— Road 8

Upon motion of Mr. Bayliss, seconded by Mr. Schilling, the following resolution was adopted:

Resolved, That the action of the Chairman in refunding to Okeechobee county the sum of \$136,570.71, representing the amount of money expended by said county for the State in the construction of State Road 8 in said county, be and the same is hereby approved.

Upon motion of Mr. Schilling, seconded by Mr. Bayliss, the expense accounts of the members were approved and ordered paid.

CONTRACTS AWARDED

Upon motion of Mr. Schilling, seconded by Mr. Bayliss, the following resolution was adopted:

Whereas, Bids were asked by the Department for the construction of the projects hereinafter designated; and

Whereas, The firms and individuals respectively named were low bidders thereon; now, therefore,

Be it Resolved, That the action of the Chairman in awarding and executing the contracts hereinafter named, be and the same is hereby approved and confirmed, which said projects and contracts are as follows, to-wit:

Project 694, Martin-St. Lucie counties; 8.48 miles, clearing, grubbing and grading; awarded to C. A. Steed & Son, \$57,508.00.

Project 693, St. Lucie county, 8.73 miles; clearing, grubbing and grading; awarded to Boone & Wester, \$54,245.35.

Project 31, Hamilton county, 11.82 miles, rock base; awarded to Duval Engineering and Contracting Co., \$219,535.56.

Project 642, Putnam county, 10.18 miles, rock base; awarded to F. S. Whitney, \$190,931.82.

Project 675, Polk county, 5.16 miles, sheet asphalt; awarded to Wm. P. McDonald Construction Co., \$233,608.99.

Project 500-A, Bay county, 9.65 miles, concrete; awarded to Noonan-Lawrence, \$327,234.52.

Project 693, St. Lucie county, 160 feet, concrete bridge; awarded to R. H. H. Blackwell, \$73,151.79.

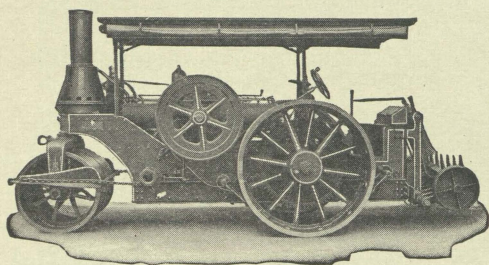
Project 694, Martin-St. Lucie counties, 327 feet, concrete bridge; awarded to C. A. Steed & Son, \$114,360.48.

Project 648, Hardee county, one mile, rock base; awarded to Wm. P. McDonald Construction Co., \$28,512.00.

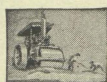
Project 676-A, Levy county, 9.95 miles, clearing,

BUFFALO-SPRINGFIELD ROLLERS

The choice of experienced
engineers and contractors



Furnished in all weights and types—
motor and steam propelled.
Inquiries Invited.



The Buffalo Springfield Roller Co.
Springfield, Ohio.



FLORIDA AGENTS

E. F. HOLMES
318 N. W. First St.,
Miami

M. D. MOODY
402 Masonic Temple,
Jacksonville

FOR—

Road Construction
Low-Cost Maintenance
McCORMICK-DEERING
TRACTORS
ARE
DEPENDABLE
POWER UNITS

International Harvester Co.
OF AMERICA

434 E. Bay St.

Jacksonville, Fla.

grubbing and grading; awarded to Gilbert & Hadsock, \$44,432.35.

Project 676-B, Levy county, 14.39 miles, clearing, grubbing and grading; awarded to McLeod Construction Co., \$125,779.32.

Project 673, Gadsden county, 20 feet, concrete bridge; awarded to Peterson & Ernhart, \$9,752.00.

Project 38, Escambia county, surfacing bridges; awarded to Atlantic Bridge Co., \$25,690.90.

Project 543, Seminole county, 14.2 miles, clearing, grubbing and grading; awarded to Lake Worth Construction Co., \$99,781.48.

Project 621-C, Okaloosa county, concrete bridge, 1,363 feet; awarded to A. Bentley & Sons Co., \$133,905.28.

Project 621-B, Okaloosa county, 1,568 feet, concrete bridge; awarded to A. Bentley & Sons Co., \$143,056.

Project 668, Brevard county, 13.45 miles, clearing, grubbing and grading; awarded to E. F. Powers Construction Co., \$108,298.71.

Project 564-C, Charlotte county, 3.93 miles, clearing, grubbing and grading; awarded to E. F. Powers Construction Co., \$38,422.71.

Project 595, Volusia county, 6.43 miles, rock base; awarded to L. M. Gray, \$110,929.25.

Project 53-A, Lake county, 7.09 miles, clearing, grubbing and grading; awarded to B. Booth & Co., \$54,775.14.

There appearing no further business, the Department was adjourned.

THE HIGHWAY BUILDER

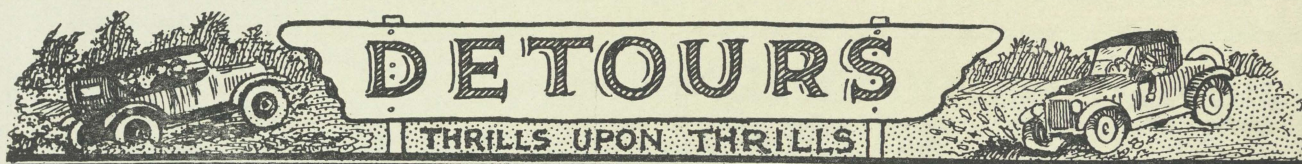
(Continued from Page 19)

Pavement design has been largely standardized, thanks to numerous experiments, such as those made in Illinois on the Bates Test Road; by the Bureau of Public Roads at Arlington, Virginia; by the State Highway Department of California in co-operation with the Bureau of Public Roads at Pittsburg, California; by the State Highway Department of Pennsylvania, and by a great number of other tests conducted by other State highway departments, universities, and industrial concerns. Many tests and experiments have been made on other types of surfacing such as sand-clay, oil sand, various asphalt combinations, slags, brick, stone, and numerous other materials.

As a result of all this investigational work, highway construction is now being done along scientific lines. And thus is being safeguarded the vast expenditures, billions of dollars, being made to build and maintain an adequate system of highways.—The Highway Magazine.

Merciless Criticism

Caddie Master (to new recruit)—“Now then, young feller, hop to it, and don’t just stand aroun’ lookin’ dumb like as if you was a member of the club!”



Welcome Little Stranger!

Meet the latest new word—motorcade. It has found its way into print and is doubtless already knocking impatiently at the door of Messrs. Funk & Wagnalls. Motorcade on first acquaintance has a way of staggering the innocent bystander. Certainly any one who attempts to get in the way of motorcade is likely to be more than staggered, for motorcade means a procession of motor-cars. The Past had its cavalcade; the Present has its motorcade. In the bright lexicon of the future we shall doubtless have to make way for aircade. Or will it be aerocade or perhaps avicade? Whichever it may be, its advent seems certain, and those of us who don't make way for aircade (or aerocade or avicade) will make just so many fewer jay-flyers for the world to conjure with.—F. W., in Life.

According to Prof. H. F. Covington, Princeton students have increased their vocabularies 3,000 words in the last ten years. Anything to beat Harvard!—Life.

It must take a lot of moral courage for a woman to accept a winter trip to the tropics just after having achieved a raccoon coat.—South Bend Tribune.

Let us pray that the 1927 model will be a self-washing automobile.—Louisville Times.

When the first organized government was founded is not known. All that can be said with certainty is that the following day a cry went up for tax relief.—Detroit News.

Doesn't Carry It on a Banner

"Maude doesn't show her age; do you think she does?"

"Why no—if you mean that she doesn't point it out in the family Bible."—Boston Transcript.

Stockings or Garden?

The bride wore a white satin dress with veil caught up with orange blossoms and carried a bouquet of white hoses.—Social item in a Pittsburgh (N. Y.) paper.

Scientist says we retain the same brain cells we had in infancy. That explains a good deal—Winston-Salem Journal.

The objection to gardening is that by the time your back gets used to it your enthusiasm is gone.—Baltimore Sun.

The clothes of the London girl will weigh less than thirty ounces, it has been estimated. However, the cost will be estimated in pounds.—Louisville Courier-Journal.

The Complete Angler

The novice at trout fishing had hooked a very small trout, and had wound it in till it was rammed against the end of the rod.

Pupil—"What do I do now?"

Instructor—"Climb up the rod and stab it."—Dry Goods Economist.

If dancing is the poetry of motion, then modern steps are the vers libre.—Wall Street Journal.

They were talking about inventions.

"The man who invented the flyin' machine was a great genius," said Pat.

"Hi think wireless is the greatest invention," said 'Arry.

"Vell," said Ignatz, "de fellow vat invented interest he vas no slouch."

The boy who everybody said was going to the dogs a few years ago now is a man who thinks other boys are going to the dogs.—Pittsburgh Chronicle Telegraph.

The Man with the Iron Face

The front end of the rack struck the young man in the face and badly damaged the front end of the truck.—Idaho paper.

Rattles

"Can any one tell me," asked the teacher, "what makes the sound we call tintinnabulation?"

"Please, ma'am," replied a youngster, "it's pa's second-hand flivver."

Teacher asked her class if they could compose a rhyme using the word "Nellie." Johnny Jones, being called upon, rose, much embarrassed:

"There was a pretty little girl named Nellie,

"Who fell in the water and wet her little feet."

"Why, Johnny! That doesn't rhyme."

"I know it don't. The water wasn't deep enough."—Taos Valley News.

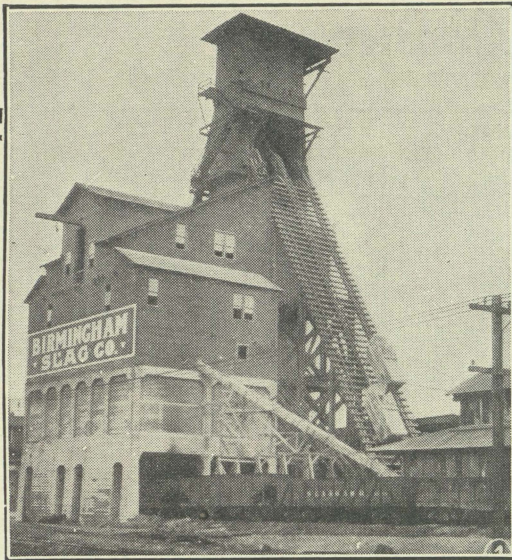
Any Old Way

A couple of tourists passing through Georgia came across a road of whose destination they were uncertain. Seeing an old colored woman rocking on a nearby porch, they called to her, "Auntie, can you tell us where this road goes?"

She gazed thoughtfully at the winding country road, and took her pipe out of her mouth long enough to enlighten them.

"Well, Honey," she said, "hit goes fust one place and then another."—Georgia Highways.

Blessed are the peacemakers. Nobody erects hideous bronze statues of them.—Rochester Times-Union.



Plant No. 1 at Ensley, Ala., where the famous "Ensley Basic Slag" is produced at the rate of 4,000 tons per day.

*"Blast Furnace Basic Slag
Headquarters for the South"*

Four Big Plants

(two just completed)

Have a combined
daily capacity of
6,300 tons of scien-
tifically prepared

"ENSLEY" & "ALA CITY"
BASIC SLAG
CRUSHED & SCREENED

Two New Plants

Plant No. 3, Bessemer,
Ala.: 1,000 tons avail-
able daily for shipment
over 6 railroads.

Plant No. 4, Alice Fur-
nace, Birmingham: 300
tons available daily for
shipment over 9 rail-
roads.

After the pure molten Slag has been re-
claimed from the modified pits by powerful
electric shovels it is hauled over our own
railways to these four modern plants.

Here the slag is crushed, screened, and
sized to meet standard specifications.

These four plants produce practically the
South's entire output of pure Blast Furnace
(Basic) Slag. They have a combined daily
capacity of 6,300 tons—adequate for your
demands no matter how heavy they may be.

The wide use of Slag, both as a road metal and
concrete aggregate, has been established by pure
Basic Slag as scientifically prepared for standard
specifications by these plants.

STANDARD SIZES

Number	Use	Size
*1	For Roads	4" to 2 1/2"
*12	For Roads	4" to 1 1/2"
*2	For Roads	2 1/2" to 1 1/2"
*23	For Concrete	2 1/2" to 3/4"
3	For Concrete	1 1/2" to 3/4"
34	For Concrete	1 1/2" to 1/4"
4	For Paving	3/4" to 1/4"
**4-A	For Paving	1 1/4" to 1/4"
46	For Paving	3/4" to 10 mesh
*6	For Paving	5/8" to 10 mesh
*6-A	Washed Roofing	
	Slag	5/8" to 1/4"
7	For Roads	1/4" to dust

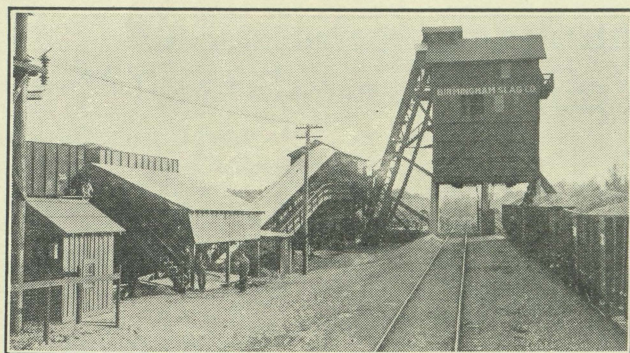
*These sizes produced at Ensley
plant only.

**This size produced at Besse-
mer plant only.

Birmingham Slag Co.

Slag Headquarters for the South

ATLANTA BIRMINGHAM MONTGOMERY
THOMASVILLE OCALA, FLA.



Plant No. 2 at Alabama City, Ala., where the well-known "Alabama City Basic Slag" is produced. This modern crushing and screening plant has a daily capacity of 1,000 tons.

Status of Road Construction

THROUGH MAY 31, 1926

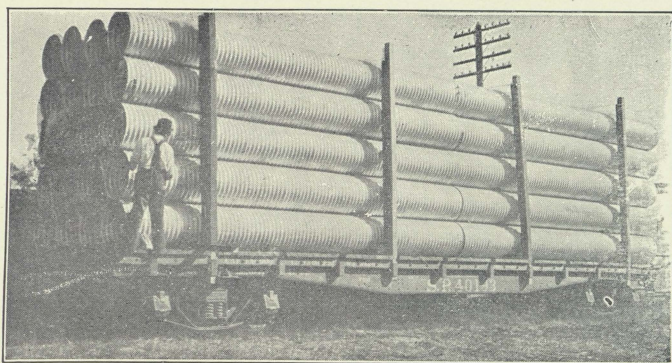
Project No.	Contractor	Road No.	County	Total Length Miles	Clearing Miles	Grading Miles	Base Miles	Surface Miles	Type	Per Cent Complete
17	Duval Engr. & Contr. Co.	2	Hamilton	8.20			8.20	4.10	S.T.	95.50
31	Duval Engr. & Contr. Co.	2	Hamilton	11.82			1.74	0.00	S.T.	13.20
40-A	C. F. Lytle	4	Brevard	16.17	16.17	16.08	15.36	7.00	S.T.	95.00
41	Morgan Hill Paving Co.	4	Dade	12.00	10.78	5.39	0.00	0.00	S.A.	16.00
46	B. Booth & Co.	3	Nassau	11.52	11.52	11.52			G.	98.00
47	Boone & Wester	4	St. Johns	14.96	13.47	10.48			G.	80.00
48	A. J. Hoffman	4	St. Johns	15.39	14.82	8.13			G.	57.00
49	A. J. Hoffman	4	Flagler	13.81	8.57	.97			G.	18.00
50-B	B. Booth & Co.	14	Putnam	9.77	7.82	4.40			G.	47.00
51	Noonan-Lawrence	7	Escambia	6.28	4.39	4.39		2.20	Conc.	40.40
500-A	Noonan-Lawrence	20	Bay	9.65	0.00	0.00		0.00	Conc.	0.00
514	State Convict Forces	1	Jackson	11.04	2.00	.60		0.00	S.C.	15.00
562-A	H. E. Wolfe	8	Highlands	5.37			0.00	0.00	S.T.	0.00
581	Barnes & Smith	5	Hillsborough	12.10	12.00	11.80	10.89	0.00	S.T.	94.00
586	Gillis Const. Co.	1	Jackson	17.37	17.37	17.37		17.37	S.C.	100.00
595	Strickland & Travis	3	Volusia	7.43	7.43	7.43			G.	100.00
613	Broadbent Const. Co.	5	Sarasota	4.62	4.62		3.46	0.00	S.A.	55.00
614	State Convict Forces	5	Sarasota	17.07	4.50	2.00			G.	13.00
617 & 618	L. M. Gray	5	Alachua	16.06			.56	0.00	S.T.	3.50
618	J. R. & J. B. Miller	5	Alachua	10.89	10.89	10.89			G.	100.00
621	Penton-Mathis Const. Co.	1	Okaloosa	17.35	12.32	7.81			G.	40.15
623	State Convict Forces	35	Madison	12.91	9.04	10.42		0.00	S.C.	59.27
627	L. M. Gray	2	Putnam	6.27	6.27	6.27	3.14	0.00	S.T.	70.00
631	E. P. Toulmin	1	Washington	8.53	8.53	3.70			G.	45.00
633	Taylor Contr. Co.	1	Gadsden	9.61	9.61	9.61		8.10	S.C.	98.00
634	State Convict Forces	1	Jackson	11.07	11.07	10.18		8.75	S.C.	83.20
641-A	Chas. F. Wilmore	4	Palm Beach	11.36	5.34	3.07			G.	20.60
642	B. Booth & Co.	3	Putnam	10.82	10.82	10.60			G.	98.00
642	F. S. Whitney	3	Putnam	10.82			1.02	0.00	S.T.	7.00
644-A	Gillis Const. Co.	10	Wakulla	8.49	2.97	2.97			G.	36.00
647	H. E. Wolfe	8	Highlands	7.72	7.72	7.72	7.72	7.72	S.T.	100.00
648	Federal Contr. Co.	2	Hardee	14.17	10.63	9.21			G.	58.00
648	Wm. P. McDonald Const. Co.	2	Hardee	1.00	0.00	0.00	0.00	0.00	S.T.	0.00
649	Penton-Mathis Const. Co.	33	Okaloosa	10.42	10.42	10.42		8.00	S.C.	90.00
651	State Convict Forces	10	Gulf	14.72	9.56	7.55		0.00	S.C.	27.30
652	Penton-Mathis Const. Co.	33	Okaloosa	9.04	9.04	9.04		4.00	S.C.	90.00
655	H. E. Wolfe	18	Highlands	13.26	13.26	11.54	7.16	0.00	S.T.	70.00
657	State Convict Forces	6	Jackson	10.00	8.00	7.50		6.00	S.C.	60.00
658	Myers Const. Co.	1	Holmes	8.21	6.34	6.34			G.	73.00
660	B. Booth & Co.	3	Clay	10.52	8.42	4.42			G.	40.00
661	Sou. Paving Const. Co.	2	Lake	3.52	3.17	3.17	3.27	1.23	S.A.	71.00
663	Taylor Contr. Co.	5	Citrus	8.03	7.63	6.42			G.	71.60
666	State Convict Forces	6	Jackson	6.52	6.52	6.52		6.00	S.C.	95.00
669-B	M. C. Winterburn, Inc.	27	Dade	10.32	10.32	10.25	0.00	0.00	S.T.	75.00
670	State Convict Forces	6	Jackson	12.30	12.30	9.00		8.50	S.C.	65.00
672	State Convict Forces	1	Leon	9.92	9.92	6.00		4.47	S.C.	80.00
673	State Convict Forces	1	Gadsden	9.90	7.00	5.50		0.00	S.C.	45.00
675	Wm. P. McDonald Const. Co.	17	Polk	5.16	2.73	.77	0.00	0.00	S.A.	3.00
676-A	Gilbert & Hadsock	19	Levy	9.95	0.00	0.00			G.	0.00
676-B	McLeod Const. Co.	19	Levy	14.39	0.00	0.00			G.	0.00
679	Taylor Contr. Co.	5	Hernando	7.11	5.34	4.20			G.	39.56
682	Caye-Andrews Co., Inc.	5	Citrus	6.45	5.81	4.33			G.	86.00
689	J. W. Hall	5-A	Alachua	1.67	1.67	1.25			G.	65.00
693	Boone & Wester	4	St. Lucie	8.73	1.73	.61			G.	10.70
694	C. A. Steel & Son	4	Martin	8.48	0.00	0.00			G.	0.00
Total Complete May 31st, 1926					1494.28	1443.85	605.94	1166.03		
Complete Month of May 1926					30.00	28.30	15.84	25.22		
Total Complete April 30th, 1926					1464.28	1415.55	590.10	1140.81		

TOTAL MILEAGE COMPLETE

	Concrete	Brick	B.C.	S.A.	B.M.	Asp.	Blk.	S.T.	S.C.	Marl	Total
Complete to April 30th 1926	108.40	17.15	10.74	59.11	89.07	23.20	431.28	441.82	45.86		1226.63
Complete Month of May	1.16			1.47			9.13	6.32			18.08
Total to Date	109.56	17.15	10.74	60.58	89.07	23.20	440.41	448.14	45.86		1244.71

Note—The above tabulation shows only those projects that are actually under construction at the present time and does not show projects that have been previously completed. However, the table, "Total miles completed," at the foot includes all projects that have been completed prior to May 31, 1926, and the amounts completed in May also. The abbreviations used are as follows:

C.—Concrete. S.A.—Sheet asphalt. B.M.—Bituminous macadam. R.—Rock base. S.C.—Sand clay. G. & D.—Graded and drained. S. T.—Surface treated. B.C.—Bituminous concrete.



5 TIMES
AS EASY
TO HANDLE!

Just cut the stakes and let 'em roll!



Foot for foot, ARMCO Culverts save 80% of handling cost as compared with the old type breakable culvert.

No delays from broken culvert sections when ARMCO Corrugated Culverts are used! Just roll in the sections, clamp over the three-bolt joints, and cover 'em up—and a **permanent** job is done! ARMCO Culverts have never failed to meet state specifications.

May we Send you Further Details?

Dixie Culvert & Metal Company

JACKSONVILLE

Ocala Lime Rock—Florida's Natural Road Material

Ocala Lime Rock Co.

INCORPORATED

OCALA, FLORIDA

LIME ROCK QUARRIES

Kendrick, on A. C. L. R. R. Santos, on S. A. L. R. R.

Daily Capacity Plants, 4,000 Tons.

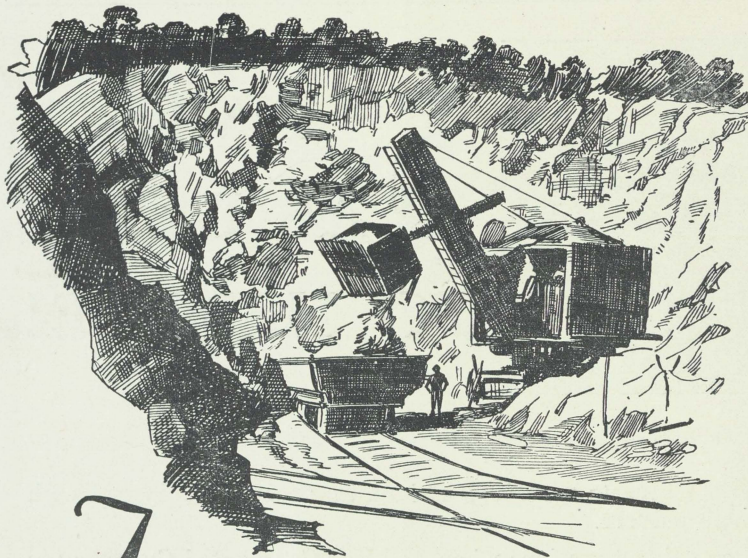
Office: Jones Building,
Ocala

Telegraph: Ocala. Phone 264.

Forty-one warehouses, conveniently located throughout the country, carry Carey Elastite Expansion Joint in stock. Your shipment arrives on time—because it is handled promptly through a warehouse near you.

The Philip Carey
Company
Lockland, Cincinnati,
Ohio





A Road 10 Miles Wide from Jacksonville to Key West

IMAGINE such a road!

Sixteen hundred miles of smoothness; an unbelievably wide, hard-surfaced ribbon rolling over the hills of Central Florida, circling the lakes and flattening to a 10-mile wide speedway to meet sea-level.

Lime Rock is immediately available in sufficient quantity to build just such a roadway!

Day after day the steam shovels of the Lime Rock quarries burrow into an almost endless tonnage of this superior road material—millions of tons awaiting, and constantly supplying, the steady demand of highway extension and replacement.

Florida need face no delay in road building through lack of Lime Rock. With a steady stream of cars, the quarries can load 500 gondolas a day, each bearing about 45 tons, enough to lay seven miles of road with a standard 8-inch base. This could go on for more than eight years before even the present estimated tonnage would be exhausted—and new resources are being constantly opened. Built into a single road, this 8-inch base would reach for 1600 miles—equivalent to a highway ten miles wide from Jacksonville to Key West.

Lime Rock answers every question as to ease of handling and economy in use. It has passed the most rigid tests for durability. When used as a base for good surfacing and laid with accurate regard for proper drainage—

Lime Rock Is the Life of the Highway

A FLORIDA PRODUCT

**FLORIDA
LIME ROCK
ASSOCIATION**

P. O. Box 1081

JACKSONVILLE, FLORIDA